Applicant respectfully submits that Mizuuchi does not disclose "wherein the waveguide is formed by proton implantation" because a generalized disclosure of an "ion implantation waveguide," does not teach, suggest, or provide motivation for the specific recitation of proton implantation in combination with other elements of claim 1. Ion implantation is "a materials engineering process by which ions of a material can be implanted into another solid, thereby changing the physical properties of the solid."[1] Any of a number of materials can be used in ion implantation, including As^+, P^+, B^+, and BF_2^+, to name a few. Protons comprise another form of charged particle, which is not specifically taught by an ion process. Proton implantation, however, involves the implantation of the nucleus of a most common isotope of the hydrogen atom.

Nowhere in Mizuuchi is there any suggestion or motivation for the implantation of hydrogen isotopes. In fact, Mizuuchi fails to disclose any particular ion for use in ion implantation of Example 3 and thus, there can be no suggestion or motivation for H^+ protons or any other ions.

In addition, Applicant respectfully submits that the proton exchange method disclosed in Mizuuchi is entirely different from the claimed proton implantation. In the proton exchange method, proton-exchanging reaction begins from the top surface of the substrate and progresses into deeper portions of the substrate. Therefore, the proton-exchanging rate decreases from the top surface to the deeper portions. In other words, the peak of the proton-exchanging rate, where a waveguide is formed, is positioned at the top surface of the substrate.

[1] http://en.wikipedia.org/wiki/Ion_implantation

In Example 9 of Mizuuchi, it appears that the waveguide 33 is positioned in a middle of the wavelength conversion device 900. However, the waveguide 33 in Example 9 of Mizuuchi is formed by first forming the waveguide 31 on a *surface* of the substrate 31 (col. 32, lines 48-55) and then attaching an $LiNbO_3$ substrate 32 to the surface of the substrate 31 where the waveguide 31 is formed (col. 31, line 66 - col. 32, line 2, lines 56-58).

In contrast, in the proton implantation method employed in the present invention, proton is introduced directly into the middle of the substrate without affecting the density of proton near the surface of the substrate.

Contrary to the Examiner's contention, Applicant submits that Applicant has not stated any equivalency between proton implantation and the methodologies of Mizuuchi. Not only does Mizuuchi fail to disclose or suggest the specifics of proton implantation, the differences between proton implantation and proton exchange as described above, necessarily results in structural differences between the claimed waveguide and the waveguide as disclosed in Mizuuchi.

Therefore, claims 1, 3, and 10 are patentable for the above reasons and for the reasons previously submitted in the Amendments of November 26, 2003, and May 3, 2004. Claim 4 is patentable for the reasons submitted in the previous Amendments.

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,

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